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EXAMINER	
CHU, CHRIS C	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/469,122	LEMMI ET AL.	
	Examiner	Art Unit	
	Chris C. Chu	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 6, 8, 9, 11 - 17, 19 - 26 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 6, 8, 11, 14 - 17, 19 - 26 and 29* is/are rejected.

7)☒ Claim(s) *9,12 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on November 7, 2003 has been received and entered in the case.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 17 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 17, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 17 recites the broad recitation "a laser", and the

claim also recites "including a plurality of lasers" which is the narrower statement of the range/limitation.

In claim 24, the term "high" is a relative term which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 – 6, 8, 11, 16 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Worley '183.

Regarding claim 1, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7 and column 8, line 1 – column 10, line 2 a hybrid device comprising:

- a substrate (606);

- a spring interconnect (604, pad on the element 606 and a portion of a layer that holds or fixes the pad in the substrate) formed on the substrate, the spring interconnect including,
    - an elastic material that is operatively associated with a surface of the substrate including,
    - an anchor portion (end portion of 604, pad on the element 606 and a portion of a layer that holds or fixes the pad in the substrate) fixed to the substrate, and
    - a free portion (the curved portion of 604) spaced from the substrate, the free portion including a tip (the other end portion of 604 which is on the element 602) separated from the substrate; and
- a sensor (303) formed on the substrate, the sensor including an active layer and contacts, said active layer configured to sense light (light from 301 and read column 9, lines 19 and 20) and be at least partially transparent to light at selected wavelengths,
- said spring interconnect and said sensor being integrated on the substrate.

Regarding claim 2, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7 and column 8, line 1 – column 10, line 2 the hybrid device further including at least one of a single light source (301), an array of lasers, and an array of light emitting diodes (LEDs; e.g., column 12, line 1), positioned to emit light at least a portion of light through at least a portion of the sensor.

Regarding claim 3, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 and column 12, line 1 the sensor being designed and aligned with at least one

of the laser array and the LED array, to receive the emitted light from at least one of the single light source, some of the lasers of the laser array and some of the LEDs of the LED array.

Regarding claim 4, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 and column 12, line 1 the sensor, including the active layer, being designed and aligned with at least one of the laser array and the LED array to receive and pass, through the active layer, an amount of the emitted light from a portion of at least one of the laser array and the LED array sufficient for a printing operation. Furthermore, the limitation "sufficient for a printing operation" is intended use language which does not differentiate the claimed apparatus over Worley.

Regarding claim 5, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 and column 12, line 1 the substrate being designed and aligned with at least one of the laser array and the LED array to receive and pass, through the active layer, an amount of the emitted light from a portion of at least one of the laser array and the LED array sufficient for a printing operation. Furthermore, the limitation "sufficient for a printing operation" is intended use language which does not differentiate the claimed apparatus over Worley.

Regarding claim 6, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, and column 12, line 1 the sensor being an array of sensors.

Regarding claim 8, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 the sensor (301) and the spring interconnect (604) being comprised of materials which allow for integration of the spring interconnect and the sensor on the single substrate during a manufacturing process, wherein at least one of the materials for the spring interconnect and the sensor is the same.

Regarding claim 11, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 the elastic material being a stressed metal layer having sub-layers of differing stress gradients.

Regarding claim 16, Worley discloses in e.g., Fig. 3B, Fig. 6B, Fig. 7, column 8, line 1 – column 10, line 2 the spring interconnect being a plurality of spring interconnects.

Regarding claim 29, Worley discloses in e.g., Fig. 4B and column 10, line 22 – column 11, line 49 a hybrid device comprising:

- a substrate (606);
- a spring interconnect structure (604, pad on the element 606 and a portion of a layer that holds or fixes the pad in the substrate) formed on the substrate, the spring interconnect including:
    - an elastic material that is operatively associated with a surface of the substrate including:
        * an anchor portion (end portion of 604, pad on the element 606 and a portion of a layer that holds or fixes the pad in the substrate) fixed to the substrate, and
        * a free portion (the curved portion of 604); and
- a sensor (303) formed on the substrate, the sensor including an active layer and contacts, said active layer being capable of sensing light (read column 9, lines 19 and 20),
- said spring interconnect and said sensor being integrated on the substrate.

6. Claims 17, 19, 20 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Chin et al. '223.

Regarding claim 17, Chin et al. discloses in e.g., Fig. 5A, Fig. 6A, Fig. 6B, column 4, lines 20 and 21 and column 5, lines 43 – 53 a hybrid device comprising:

- a laser (112 or 166 and column 4, line 21) device capable of emitting light at a certain wavelength and including a plurality of lasers;
- a substrate (162);
- a spring interconnect (160) formed on the substrate, the micro-spring interconnect including,
    - an elastic material operatively associated with a surface of the substrate including,
    - an anchor portion (end portion of 160 which is attached to the element 162) fixed to the substrate, and
    - a free portion (the curved portion of 160) spaced from the substrate; and
- a sensor (164) formed on the substrate, in an integrated manner, with the spring interconnect, the sensor including an active layer and contacts,
- wherein said substrate and said sensor, including the active layer, are at least partially transparent to light at the wavelength emitted by the laser device; and
- said at least one of the sensor and said at least one spring interconnect being separately fabricated and aligned, such that at least a portion of the light emitted directly by the laser device is directed through at least a portion of the substrate and the active layer of the sensor (see Fig. 5A).

Regarding claim 19, Chin et al. discloses in e.g., Fig. 5A, Fig. 6A, Fig. 6B, column 4, lines 20 and 21 and column 5, lines 43 – 53 the sensor being sized such that each of the lasers emits light at least partially through the sensor.

Regarding claim 20, Chin et al. discloses in e.g., Fig. 5A, Fig. 6A, Fig. 6B, column 4, lines 20 and 21 and column 5, lines 43 – 53 the sensor being a plurality of sensors (column 6, line 60), sized such that a sub-group of the lasers "may" emit light through selected ones of the sensors.

Regarding claim 22, Chin et al. discloses in e.g., Fig. 2, Fig. 5A, Fig. 6A, Fig. 6B, column 4, lines 20 and 21 and column 5, lines 43 – 53 a calibration/printing system comprising:

- a sensor (164) configuration including a sensor element integrated on a substrate (162) with a plurality of spring interconnects (circuit traces on the element 160);
- a light source (166) aligned with the sensor configuration such that at least a portion of the light directly from the light source is sensed and passed through the active layer of the sensor and at least a first of the spring interconnects is in physical contact with a portion of the light source; and
- a driver chip (12) aligned with the sensor configuration and the light source such that at least a second of the spring interconnects is in physical contact with a portion of the driver chip, and a communication path is formed between the light source and the driver chip by the at least first and second spring interconnects.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Worley in view of Sekiguchi '650.

Regarding claim 14, Worley discloses the claimed invention except for a switch is located, between the sensor and the substrate, such that the sensor is an active semi-continuous sensor. However, Sekiguchi teaches in Fig. 6 a switch (100) being located, between the sensor and the substrate, such that the sensor is an active semi-continuous sensor. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Worley by including a switch between the sensor and the substrate as taught by Sekiguchi. The ordinary artisan would have been motivated to modify Worley in the manner described above for at least the purpose of increasing efficient utilization of the sensor. Further, as to the language on lines 2 ~ 3, the phrase "such that the sensor is an active semi-continuous sensor" is functional language which does not differentiate the claimed apparatus over Kitamura et al.

Regarding claim 15, Sekiguchi discloses in column 11, line 31 the switch being a thin-film-transistor (TFT).

9. Claims 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin et al. in view of Hammond '658.

Regarding claim 21, Kitamura et al. discloses in Fig. 4 the spring interconnect being in electrical contact with the printbar. Kitamura et al. does not disclose the lasers being arranged as a printbar. However, Hammond teaches in column 1, lines 29 ~ 38 the LEDs being a plurality of LEDs and arranged as a printbar. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Chin et al. by using the LED device being a printbar as taught by Hammond. The ordinary artisan would have been motivated to modify Chin et al. in the manner described above for at least the purpose of making the length of a row as long as the image that is to be formed an LED printbar can produce a desired image line by line (column 1, lines 31 ~ 33).

Regarding claim 25, Chin et al. discloses the claimed invention except for the light source being a printbar that has an array of light sources. However, Hammond teaches in column 1, lines 11 ~ 38 the light source being a printbar that has an array of light sources, and wherein the printbar is controlled to activate the light sources in a sequential manner to obtain calibration data to be stored in a driver. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Chin et al. by using the light source being a printbar and an array form as taught by Hammond. The ordinary artisan would have been motivated to modify Chin et al. in the manner described above for at least the purpose of making the length of a row as long as the image that is to be formed an LED printbar can produce a desired image line by line (column 1, lines 31 ~ 33).

10. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin et al. in view of Rajeswaran '534.

Regarding claim 23, Chin et al. discloses the claimed invention except for the driver chip further include: a comparator for comparing a sensor readout current from the sensor and a reference current; a converter arrangement which converts the output of the comparator into digital data representing characteristics of the light source; a set of low frequency shift registers configured to receive and store the digital data; an activation signal selectively supplied to the light source, the activation signal designed to control operation of the light source to selectively emit light therefrom; a driver designed to interpret the digital data as activation signal correction information for the activation signal; a high frequency shift-register configured to receive and store digital image data from a source external to the driver chip; and an enable/disable output signal from the high frequency shift-register to selectively supply the activation signal and light source correction information to the light source, whereby an amount of light emitted by the light source is controlled. However, note Fig. 12 of Rajeswaran, where the reference shows that the driver chip further include: a comparator (53) for comparing a sensor readout current from the sensor and a reference current (see Fig. 12); a converter (57) arrangement which converts the output of the comparator into digital data representing characteristics of the light source (column 9, lines 48 ~ 54); a set of low frequency shift registers (52) configured to receive and store the digital data; Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Chin et al. by including a comparator, a converter, and a registers as taught by Rajeswaran. The ordinary artisan would have been motivated to modify Chin et al. in the manner described above for at least the purpose of increasing efficient of the

device. Further, as to the language on lines 13 ~ 24, the phrase "an activation signal selectively supplied to the light source, the activation signal designed to control operation of the light source to selectively emit light therefrom; a driver designed to interpret the digital data as activation signal correction information for the activation signal; a high frequency shift-register configured to receive and store digital image data from a source external to the driver chip; and an enable/disable output from the high frequency shift-register to selectively supply the activation signal and light source correction information to the light source, whereby an amount of light emitted by the light source is controlled" is functional language which does not differentiate the claimed apparatus over Chin et al. Furthermore, it has been held that the functional "whereby" statement does not define any structure and accordingly can not serve to distinguish. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957).

Regarding claim 24, Rajeswaran discloses in column 7, lines 48 ~ 60 the digital image data from the source external to the driver chip being supplied as high frequency bit stream data.

11. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chin et al. in view of Yamazaki et al. '415.

Chin et al. discloses in e.g., Fig. 5A, Fig. 6A, Fig. 6B, column 4, lines 20 and 21 and column 5, lines 43 – 53 a hybrid device comprising:

- a spring interconnect structure (160); and
- at least two devices electrically connected by the interconnect structure wherein,
    - one of the devices is a sensor (168),

- and another one of the devices is at least one of a single light source (166), an array of lasers, and an array of light emitting diodes (LEDs), positioned to emit light at least partially through the sensor.

However, Chin et al. does not disclose the sensor including: a first transparent/conductive layer; an active layer and contacts, said active layer sensing light and being located on top of the first transparent/conductive layer; a second transparent/conductive layer located on top of the active layer; a passivation/release layer located over at least the first transparent/conductive layer and the second transparent/conductive layers; and an absorption layer, located between the second transparent/conductive layer and the passivation/release layer, and wherein the absorption layer absorbs unwanted visible light. Yamazaki et al. teaches in Fig. 2(D) the sensor including: a first transparent/conductive layer (2); an active layer and contacts (3), said active layer sensing light and being located on top of the first transparent/conductive layer; a second transparent/conductive layer (23) located on top of the active layer; a passivation/release layer (22) located over at least the first transparent/conductive layer and the second transparent/conductive layers; and an absorption layer (21), located between the second transparent/conductive layer and the passivation/release layer. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Chin et al. by including the sensor as taught by Yamazaki et al. The ordinary artisan would have been motivated to modify Chin et al. in the manner described above for at least the purpose of eliminating short circuit current paths in the sensor. Furthermore, the limitation "wherein the absorption layer absorbs unwanted visible light" is functional language which does not differentiate the claimed apparatus over Chin et al. and Yamazaki et al.

Allowable Subject Matter

12. Claims 9, 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 9 contains allowable subject matter because none of references of record teach or suggest, either singularly or in combination, at least the limitation of a first via through a passivation/release layer to a first transparent/conductive layer, a second via through the passivation/release layer to a second transparent/conductive layer; and first and second metal layers, deposited in the first and second vias, providing contacts to the first and second transparent/conductive layers respectively, wherein the metal layers act as signal lines to receive and carry signals from the active layer.

Response to Arguments

13. Applicant's arguments with respect to claims 1, 17, 22 and 26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Forrest et al. and Kanai disclose a semiconductor device, sensor and light source.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
2/7/04 1:58:43 AM

B. WILLIAM BAUMEISTER
PRIMARY EXAMINER